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BETTER HEALTH FOR AMERICA¹

By Dr. NATHAN B. VAN ETTEN

NEW YORK

BETTER health for America is the objective of the organized medical profession, which I have this year the honor to represent. Organized medicine is devoted to the public service and always has been in America since the first hospital was organized 188 years ago in Philadelphia for medical service to the sick poor. Today 117,000 of the physicians of the United States provide service to people of all social economic levels. These servants of the sick are on call twenty-four hours of every day.

Although the census taker insisted on recording me as working forty hours a week, there have been few days in the last fifty years in which I have not spent more than twelve hours in the service of people who

asked for it. Beginning as a general practitioner with surgical training and a generous exposure to medical education, here and abroad—a fortuitous circumstance through the medium of an epidemic of typhoid fever—the demands of other infectious diseases and many calls to obstetric service gradually shaped my course into the field of internal medicine. This very ordinary experience has been shared by thousands of physicians who have been making available this type of public service with considerable satisfaction to the American people.

Organized medicine has been trying for the last ninety-four years to inspire all its members, who represent 85 per cent. of the active practitioners in the United States, with high ideals and with a sense of their responsibility for good public service. It has often been obliged to censor the conduct of members who have been involved in quackery or questionable

¹ President's address before the American Medical Association at the ninety-first annual session, New York, June 11, 1940.

commercialism. It has often been obliged to take the field against unlicensed people who have mercilessly exploited the confidence of sick people who were suffering from incurable cancers or other fatal conditions. Some of these criminals have fought back and are still evading the law of the land, but in every instance the efforts of organized medicine on behalf of the people have been justified.

HEALTH EDUCATION OF THE PUBLIC

There would seem, however, to be no end to the necessity for organized medicine to exercise its educative crusades, because there seems to be no prospect that human credulity can be relieved from its beliefs in miraculous performances of conscienceless swindlers.

Ignorance is responsible for many tragedies. Organized medicine will not fulfil its functions as the protector and promoter of the public health unless it continues with greater enthusiasm and greater determination to educate the people in every phase of healthful living and without reservation warns them against the dangers of untreated communicable diseases. Plain talk in unpleasant language must not be shirked if necessary to shock ignorance into intelligence.

We must not take negative positions at a time like this when all sorts of wild theorists are shouting into the public ear. The people seem to be eager for health education and we must give it to them honestly and freely if we really want America to be a better and happier place in which to live.

EDUCATION OF THE PHYSICIAN

The practical education of the physician seems to take on new significance with the necessity for integrating physicians and laymen in informative campaigns to win support for the medical profession. Only in this way can we succeed in efforts to maintain the quality of medical service in the face of organized attacks by those who would substitute mass medicine for our present system.

I question the practicalities of the present pursuit of the degree of doctor of medicine, which follows a course of education which is too long and too short; a course which is more heavily loaded than is required for any other professional degree; too long to permit the student to enter practical life in his best years and too short to feed him the special fundamental knowledge he should possess before he steps into his public service.

Eight years of required college work brings the average student to 26 or 27 years of age before he leaves school. Then he must have two years of hospital work to learn the practical application of some of the facts he has learned. He will then be 29 or 30 years old before he may be permitted to earn his living through professional work. I do not believe that four years of

medicine is too long or long enough, but I believe that some procedure should be evolved to bring the physician earlier into practice. Possibly he might be well prepared for his peculiar life by giving him six years of scientific and medical education, omitting all frills and specialty teaching and concentrating on practical general medicine, and minor surgery and traumatology and obstetrics, in order to give him the best preparation for the average care of the average patient.

Internships are most valuable opportunities to learn practical medicine. The patients are human beings who represent the average of clinical experience. If the intern is wise he will think of them as prototypes of the patients he hopes to have; he will study each one as an individual; he will try to learn something of his biologic inheritance and his social experience; he will not classify him as a case of this or that disease but as a person suffering from a disease; he will not treat a disease but he will treat the patient. If he will always do this he will come to know people, and such knowledge will attract people to him.

Concentration of medical education into six years of scientific study will, of course, be criticized by the advocates of broad culture which they claim is necessary to the joy of living and the understanding of human problems. I believe, however, that giving the physician as clear a vision of the physiology of life as possible would be the best equipment for him to apply as a scientific approach to the treatment of sick people, who will in their turn educate him in the real values of public service.

If the physician has a flexible intelligence he will, no doubt, follow an inclination toward some satisfactory hobby. A surprising number of physicians have found delight in the pursuit of the charms of music; many have recently exposed to public view their accomplishments in the fields of painting and sculpture; many have found leisure for the refreshment of outdoor sports and the pursuit of studies in natural history.

Cultures will bless the physician if he desires it, but his chief satisfactions will come from his efforts to help people who are suffering from the incapacities of sickness.

THE SPECIALTIES

All modern medicine has been developed within the last fifty years, so rapidly that it has been difficult if not impossible to include more than smatterings of the teaching of specialties in courses supposed to cover the entire field of medicine and surgery. New ideas have dazzled imagination with the brilliant prospects of solution of age-old problems of diagnosis and cure. Students have been lured into following gleaming stars before they have firmly planted their own feet on firm foundations.

Probably inspired by romantic admiration of bril-

liant individuals, many interns enter hospitals with definite ideas of becoming specialists. A good many young physicians who take short cuts into specialism immediately after leaving their internships are lured by the dream of quick financial reward. They do not know that very few specialists have attained material success. They do not realize that the specialist has experienced greater difficulty in times of depression than the general practitioner.

It is claimed that the competent general practitioner can give satisfactory care to 85 per cent. of all sick people. Competent general practitioners who have adapted themselves to the financial competence of their patients and have asked modest fees have had plenty of work during the last decade, while specialists have been idle because people were unable to pay them and because they were known to have limited themselves to very narrow fields.

Specialism has been overdone to the great injury of the specialist. Many unqualified practitioners have called themselves experts. The special societies have tried to raise the quality of specialization by setting up examining boards and are apparently meeting with success. They intend that only the really qualified may be permitted to identify themselves with special titles. These are doctor's doctors to whom difficult problems should be referred, but there are too many of them. I myself know expert men who are seriously embarrassed and are very unhappy because they do not know how to step down from their conspicuous places. It is just as true now as it always has been that specialists are greatly helped by a knowledge of the whole man gained through years of general practice. It is axiomatic that a young doctor can not begin at the top, and therefore his education must be devised to prepare him to understand the average clinical problems which are presented by average patients.

DEMANDS CAUSED BY MODERN LIVING

Life has been so externalized by scientific disclosures of one objective revelation after another that the results have been accepted without inquiry as basic facts from which to step steadily forward from one civilizing accomplishment to another. Electric light and power, telephones, radios, modern plumbing, airplanes, automobiles, all are accepted as necessities of life. Everybody must use them to live contentedly. All must be items in the daily budget. Cheap moving picture entertainments are considered necessary satisfactions; all divisors of time and the vitality and the cost of living; all changing man's point of view; all educating him; all prodding him to sleepless activity and to superficiality. Man is too busy to think beyond the current moment; too busy to know his own children who are too busy to enjoy family life; too busy to remember the abiding precepts of religion; too busy to pass those

satisfactions along to his children; all pursuing elusive pleasures of work or play which may lead them into early neuroses which make them difficult or impossible to live with.

Because modern speed has eliminated the horse and buggy doctor, his successor is confronted with the prospect of more difficult and newer educational demands.

Education of every physician must continue throughout his life. Many of the constituent bodies of the American Medical Association now carry on this work, in some counties enlisting the interest of more than 90 per cent. of all resident physicians. Not only the city physician who has many opportunities for stimulating study but the most remote country physician is eagerly receptive of these efforts to bring to him the most modern ideas and technics of clinical medicine.

I have recently seen the graphic charts of postgraduate education in clinical medicine in Tennessee where the response of physicians from remote mountainous districts as well as from the town was most remarkable. In many instances physicians brought their immediate clinical problems to the classes for study and consultation.

There are of course physicians who rarely study, who practice the kind of medicine they started with when they left the medical school. I believe this lazy attitude is more common in large cities where physicians have easily available institutional help which they may call on when they get beyond their depth than among country physicians, whose very existence depends on self-reliance.

COUNTRY PRACTICE

Only competent physicians can succeed in country practice—ignorance and chicanery are quickly detected in places where the physician is conspicuous because he stands alone. The only safe place for incompetents is in cities, where they may hide in the crowds.

If young physicians who are fortified by strong characters, good education and real ability will seek small towns or country fields, they will find plenty to do for real people and the satisfaction of living, which are denied them by the lack of all kinds of elbow room in big cities.

A good quality of medical service is needed in every part of our country. The United States presents every physical characteristic, mountains and valleys and arid lands and fertile lands, sea coasts, rivers, harbors, lakes, mines, oil fields, great crowded cities, small towns and farms, hot and cold climates, good and poor transportation, good and bad roads—all creating and modifying medical problems.

HOSPITALS

The people who live in this country represent every race, every religion and speak every tongue, but they are all human beings anatomically and physiologically

the same, with the same necessities for physical care. All of them need available medical care for all ordinary illnesses and accessible places where they may be hospitalized for conditions which can not be treated at home.

The President of the United States thought of such facilities in his new proposal to build small hospitals where they are needed. They do not need to be elaborate buildings, expensively furnished, but clean places where sick people may be sheltered and cared for by local physicians who are competent. The competence of the physician is more important than the quality of the building.

I have met Harrison of Arabia, who is the only physician in a large section of that country. He has a hospital which has no beds. His patients lie on concrete floors. He does an almost incredible amount of surgery with remarkably good results. He has no trained assistants, no trained nurses, very little material to work with, but he is himself a well-educated and well-trained surgeon. He is the hospital. He is a master craftsman.

Many country physicians possess comparable quality which has been developed through their ability to meet tragic emergencies with sole reliance on their own general knowledge. Many of them have developed overtones of personality which inspire confidence.

THE BASIS OF BETTER HEALTH

Better health for America would, of course, be promoted if medical help could be closely available to every citizen, but it is equally important that only well-qualified medical help may be so provided. Medical organizations must set up criteria of competence of physicians who may be permitted to give medical and surgical care to our people. Hospitals facilitate good care, but the education of the physicians who administer it must be the concern of the councils of organized medicines as exemplified in the American Medical Association.

Planting physicians in industrial communities and subsidizing them by salaries or pay-roll deductions has in some instances worked to the satisfaction of sick employees, and a fair quality of service has been delivered; but in other places incompetent or poorly equipped physicians held these places with a mere desire for subsistence rather than an ambition to bring good clinical medicine to people whose living standards were fixed as low as possible to satisfy the financial ambitions of their employers. These people had no personal choice of physician because none was available or permitted. Conditions comparable to a low type of European panel practice prevailed and provided poor medical service. Employment of physicians by membership societies, lodges or other groups domi-

nated by autocratic authority has frequently resulted merely in exploitation of the group by employing physicians at low salaries. For their services the members paid a periodic contribution, and from this the management made a profit. Or perhaps a young physician who happened to be very competent but who needed the money was employed and exploited for an inordinate profit to the society or to some agent who had contracted to furnish medical service.

These promotions are going on and are attractive to speculators, who see an opportunity for rich material gain from enlisting people who desire to protect their future health through small periodic contributions. Where these organizations limit medical service to one physician or to a selected panel of physicians, the prospect of good medicine is not bright.

Many medical service plans involving free choice of physicians by the membership are in process of evolution and may be of great value as they merely limit the physician's fees according to commonly adopted schedules such as those provided by systems of workman's compensation.

Many hospital service plans promise ample satisfaction to subscribers and seem to be basically sound, provided they are honestly and intelligently administered.

All these forms of delivering service to the sick need to be continuously studied by medical organizations in the interest of better health for all our people.

Although there is general harmony within our membership, there are occasionally disagreements by small groups concerning policy which are generally met and satisfied in the regular process of the operations of county and state societies or in the deliberations of the national House of Delegates. There are sometimes small self-important groups which are unwilling to go through the routine county, state and national procedure and are so impatient that they jump the orderly freedom of fraternity, rebel against the thoughtful evolution of their great organization and parade their discontent in the public press.

It sometimes appears that they are selfishly dissatisfied with their own local environment and attempt to override the controlling opinions of their associates. They seem to be uncomfortable in any society. Their arguments are sometimes provocative and sometimes deserve the courteous attention they receive, but, unless they prevail, like spoiled children they sulk in their corners.

It sometimes appears that they are seekers after special privilege and desire special subsidies for their special operations.

These agitations and other unjustified technical appraisals of our public service have only served to strengthen our national organization, which has grown

rapidly during the last four years as a responsive reaction among physicians to what they consider unjustified attacks.

Dividing the profession into groups of surgeons, internists, obstetricians, gynecologists, urologists, ophthalmologists, otologists, radiologists, pathologists is valuable for intensive scientific discussions and the results which may grow from them, but splitting the profession perpendicularly along the lines of creed or race or socio-political ideologies and developing rivalries and exaggerated desires for special privilege savors of the techniques which have divided industrial workers into classes, all fighting for what they consider their proportional rights. Such tendencies are subversive of the strength and effectiveness of the great body of American medicine, which should present a solid front in all efforts to promote public service in American health.

PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

You are all familiar with the text of the new platform of the American Medical Association. Every word of it is objective. It denies the allegation that the association is reactionary and static and anti-social.

There is general agreement that the association is moving consistently with conservation of real verities and real values, and that projection of new objectives promises to carry American medicine as a strong influence in the administration of the health programs of our country.

The American Medical Association stands for orderly and continuous progress toward better health for every American citizen. It stands for the elimination of every influence which may be destructive of the public health. It stands for the elimination of every communicable disease. It stands for the elimination of quackery. It stands for better general understanding of personal health problems. It stands for the promotion of research into fundamental causes of disease and curative therapy. It stands for better education of all physicians, not only the undergraduate but the general practitioner who has been long in service. Its platform stands for the coordination of all governmental health functions in order to promote efficiency and eliminate duplication of effort and wasteful extrava-

gance of the people's money. It stands for the treatment of the sick in their homes by local physicians and welfare agencies—where the real individual troubles are known—and it desires as little interference by the central government as may be consistent with constructive relief of personal suffering. Its program is entirely forward-looking and it seeks to carry it on in conformity with the best traditions of an advanced democracy.

The dictators of organized medicine are the practitioners of medicine, every one of whom has a voice which will be heard when it expresses a constructive thought even though it expresses adverse criticism. Nothing short of the best public service the organization can give will content the great body of medical opinion that is represented by the American Medical Association.

In conformity with the best traditions of this organization at the first intimation of the possible involvement of the United States in a wide struggle with ruthless paganism, the American Medical Association offered all its organizational resources to the government. In the office of the association there is filed the personal history of every medical student and every physician of the United States. Here only is the recorded competence and character and availability of those who may be called to the medical defense of our country. Defense against disease is quite as important as defense against a foreign enemy. Defense against the destructive invasion of our democratic ideals is an immediate concern of all Americans. This afternoon the House of Delegates responded unanimously to the request of the government for preparedness of the American medical profession and has erected the machinery to put it into immediate operation.

The pagans are marching over the democracies of the world, destroying their religious and their civic ideals and substituting therefor the irreligious nihilism of force.

This has been so dramatically illustrated to-day that all Americans must be convinced that we have arrived at a time and at a place when the sanctity of our national life is threatened, and if we cherish it we must fight for it with all our strength.

WORK OF THE AMERICAN MEDICAL ASSOCIATION

REPRESENTATIVES of the organized medical profession, elected by state and territorial medical associations, heard reports of activities during the past year from officers and trustees as the House of Delegates of the American Medical Association opened its annual session at the Waldorf-Astoria in New York.

There are 174 delegates in the house, including be-

sides the direct representatives of the constituent state societies, one for each of the scientific sections of the association and one each for the U. S. Army, the U. S. Navy and the U. S. Public Health Service.

REPORT OF THE SECRETARY

Dr. Olin West, Chicago, secretary of the association,

reported that the number of enrolled members as of March 1, 1940 was 115,381, a gain of more than 3,000 since March 1, 1939.

The interest of the public in medicine and its practice and in the work of the agencies of the profession has grown tremendously, Dr. West told the delegates. This development is attested by numerous signs. Officers of medical societies are constantly asked to provide speakers for public audiences, which are increasing in size. Medical subjects and medical affairs are widely discussed in the public press, and radio stations readily make available their facilities for public discussion of medical subjects. Teachers are studying and encouraging pupils to study hygiene and to apply established principles of disease prevention. Finally, Dr. West reported, tens of thousands of inquiries from individual laymen are received each year in the offices of the American Medical Association and thousands more in the offices of state and county medical societies.

REPORT OF THE TRUSTEES

The trustees reviewed the numerous activities of the association, including its publications, library, the directory of physicians, the cooperative advertising bureau by which advertising is obtained for state medical journals on a cooperative basis. Conferences have been held with numerous hospital and other medical organizations for the promotion of cooperation in various fields. A national conference on nomenclature of disease was sponsored by the association to discuss problems of disease classification.

A summary of the various steps in the developments concerning the indictment brought against the association and others by the U. S. Department of Justice December 20, 1938, was included in the report. Although on July 26, 1939, the United States District Court for the District of Columbia dismissed the indictment, the government, after an unsuccessful attempt to have the case removed to the Supreme Court without a hearing in the court of appeals, obtained a decision on March 4, in the Court of Appeals of the District of Columbia, reversing the decision of the District Court.

"In accordance with instructions given by the House of Delegates to the Board of Trustees, it is the purpose of the board to exhaust all possible effort to defend the American Medical Association against the indictment and to secure complete acquittal under the charges accusing the American Medical Association and others of conspiracy and violation of the federal anti-trust laws."

ASSOCIATION'S WORK ON FOOD, DRUGS AND PHYSICAL THERAPY

For thirty-five years the American Medical Association has had a Council on Pharmacy and Chemistry

keeping a watchful eye on the purity and safety of drugs. This council, like others in the organization, is made up of physicians busy with practice and teaching who without remuneration devote large amounts of their time to this exacting work. Two members have served continuously since the creation of the council in 1905.

In these thirty-five years the council's work, at first largely concerned with the investigation and exposure of unwarranted claims for drugs, has materially changed.

"There still exists, however, a tendency on the part of some manufacturers of proprietary products to make overenthusiastic claims for their products, to promote complex mixtures of well-known drugs under fanciful names, to exploit unessential modifications of established drugs and to promote the sale and use of products intended for therapeutic purposes before scientific evidence of therapeutic value has been established."

Sulfanilamide has attracted more attention within the last few years than any other product, the council said. It has been necessary to issue three revisions of the original statement on the action, dosage and uses of this drug, so fast has been the advancement of knowledge developed through scientific investigations. This particular study was made with the cooperation of a hundred investigators.

Other subjects of investigation by the council in the past year included hormone treatment, the status of vitamins, local anesthetics, manganese compounds for use in skin diseases, bismuth preparations and other products submitted by manufacturers for study.

A well-equipped chemical laboratory is maintained at the headquarters of the association in Chicago. The laboratory examines new products submitted to the council and is constantly re-examining previously accepted products to aid in maintaining standards. During the past year much attention was devoted to sulfanilamide and sulfapyridine. A new product called sobisminol, used in the treatment of syphilis, was the subject of intensive study. Another interesting investigation was the use of sodium citrate and sodium chloride for the preservation of blood in "banks."

COUNCIL ON PHYSICAL THERAPY

The Council on Physical Therapy, which deals with apparatus used in the application of physical agents to the treatment of disease, has been engaged for several years in investigations of hearing aids and audiometers, the machines by which ear specialists can measure loss of hearing.

This council reports that the new vacuum tube hearing aids are now being perfected to a high degree through the application of radio engineering prin-

principles. The weight of these appliances, heretofore an obstacle to general use, is gradually being reduced to make them wearable. It is too early yet to determine the efficiency of these devices, their upkeep or their ability to stand up under exacting requirements.

One of the problems that concerns the council on physical therapy is the interference with radio reception caused by apparatus operated by electricity in hospitals and physicians' offices. Two possible methods of dealing with this knotty problem are under consideration: one is the screening of treatment rooms to avoid interference with the air waves and the other is a proposal to reserve a definite frequency band in the electromagnetic spectrum for medical apparatus.

Claims made for the virtues of sun lamps have been under the council's scrutiny. "Under the council's requirements, therapeutic claims made for sun lamps are restricted to the extent that it may be claimed that these lamps may prevent rickets, may aid in promoting the soundness of bones and teeth and play an important part in the deposition of calcium. Claims for the prevention and cure of colds, for the building up of resistance and for the prevention of respiratory diseases are not accepted for the reason that satisfactory clinical evidence to substantiate such claims has not been submitted," it was announced.

COUNCIL OF FOODS STUDIES PRINCIPLES OF NUTRITION

The Council on Foods attempts to encourage the application of scientific knowledge in the manufacture of food products and research in the field of nutrition while it tries to discourage unwarranted claims for advertising and promotions of manufactured foods, according to the report.

An official compendium of the council's work has recently been published, in which claims that may properly be made for a food product are set forth. The discussion concerns the estimated daily requirement for each of the dietary essentials and the proportions to be found in certain foods, the frequency with which an item of food may reasonably appear in the average diet, and availability from the point of view of cost and the ease with which any given dietary essential is obtainable.

It is believed that from the principles set forth in the book a manufacturer or other interested person can determine for himself what claims may legitimately be made for any food product.

As a result of an exhaustive study, the council approved the addition of vitamins, minerals or other essential elements to foods to bring them up to high natural levels. It definitely opposed, however, "indiscriminate fortification" of general foods to the point that the total content was larger than that in any natural food of its class.

OFFICIAL ATTENTION TO INDUSTRIAL MEDICINE

The growing importance of industrial medicine as a part of medical practice was reflected in the establishment of a council on industrial health three years ago. The council reported to the delegates that it has helped organize committees on industrial health in thirty-four state medical associations, has established contact with manufacturing, trade and labor associations, is studying nomenclature in occupational diseases and is looking into the "exceedingly complex field of medical relations under workmen's compensation administration."

Groundwork for improvement of the status of the industrial physician as an ethical practitioner has been laid. It is believed that this status "can be reached most rapidly through the establishment of standards of conduct somewhat specific in character which would have the effect of defining and clarifying all relationships between the physician in industry and the employer, the employee and his fellow physicians."

BUREAU OF LEGAL MEDICINE AND LEGISLATION

The bureau of legal medicine and legislation reported that Connecticut, Michigan, New York, Pennsylvania and Vermont enacted laws in 1939 authorizing the formation of non-profit corporations to operate medical service plans on a prepayment basis. Fourteen more states passed laws authorizing hospital plans on a prepayment basis.

Laws requiring persons applying for marriage licenses to present certificates of freedom from venereal disease were enacted in California, Colorado, Indiana, North Carolina, North Dakota, Pennsylvania, South Dakota, Tennessee and West Virginia.

Sale or distribution of sulfanilamide was restricted to prescriptions of licensed physicians, dentists and veterinarians in eight states.

The bureau also reviewed federal legislation in the health and hospital field, pointing out that no action had been taken on the Wagner Health Bill since it was reported out of the Senate Committee on Education and Labor last summer with approval of the general objectives, but without commitment on its framework and detailed provisions.

The report criticized the bill introduced last winter to appropriate funds for small hospitals in rural areas as "indefinite with respect to important details, an indefiniteness that does not seem to be justified by the proposals submitted by President Roosevelt in his special message. It does not, for example, definitely limit the building of hospitals to areas that are financially unable to construct needed hospital facilities. It leaves unanswered the question as to the extent to

which such hospitals are to engage in public health activities."

MEDICAL ECONOMICS

Fourteen state medical societies have experimental medical service plans in various stages of development, the bureau of medical economics reported. In some states special laws were passed to make these possible, but in others the plans proposed were considered permissible under existing statutes.

The state plans have grown out of a large number of experiments conducted by county medical societies during the period 1932 to 1938. "Never have so many, so varied or so significant projects pertaining to the distribution of medical care been developed and carried on in any country," said the report. "When several years ago the burden of medical care for the indigent disrupted the systems of county and township physicians, drained the resources of philanthropic organizations and became too heavy for physicians in private practice to bear, the various state and county medical societies developed almost the only equitable plans for efficiently distributing such resources as are available to provide medical care for the indigent."

All these temporary plans and all those now in operation should be considered frankly experimental. "If they are not found appropriate or desirable, they should be abandoned or modified," it continued. "The medical societies which abandon such experiments stand to lose the time and money expended, but under such circumstances no political, financial or occupational vested interests are created and left behind to hamper further experiments or developments."

The state medical societies have themselves provided, through appropriations from their funds and the gratuitous services of their officers or committees for the preliminary expenses of the new medical service plans.

PATENT MEDICINES, CHARLATANS AND FRAUDS

The bureau of investigation, which has exposed frauds and charlatans for many years, continues to dispense information about a wide variety of subjects to physicians, students, government agencies, newspapers, magazines, radio stations and the general public.

Most frequent subjects of inquiry included "cures" for epilepsy and cancer, nostrums advertised for relief of asthma, cosmetics, "advertising doctors," food products for which medicinal claims are made, coal tar drugs and electrical contrivances.

SHOULD MEDICAL ETHICS BE CHANGED?

Medicine's methods of practice may change, its economics may change, its science may change, but its

principles of ethics do not change any more than the basic principles of the Christian religion, the judicial council of the association declared in declining to revamp the principles of medical ethics.

For several years there has been a growing desire on the part of some physicians to have the principles of medical ethics revised to make them more liberal, specific and explanatory and by excepting physicians from the application of some features or to abandon the principles of medical ethics as being behind the times or outmoded.

These advocates of change have forgotten or do not realize, the council declared, that the principles are a statement of under-lying principles of conduct which apply to the relations of every physician to his patients, with the public and with his fellow doctors of medicine.

Many of those seeking information concerning ethical problems "have not been trying to be ethical, but have been seeking to discover by some means, such as sophisticated reasoning of hair-splitting verbiage, how far from ethical principles they can go and still be considered ethical."

The council believes that the principles of medical ethics, as set down at present, can be improved in wording and arrangement, but it also believes that the present is not the time to do the rewriting. The report concludes: "There is at present so much turmoil in medical organization and its relation to government that it seems wise to let the muddled waters settle before any consideration is given to so fundamental a feature of our organization as our principles of medical ethics."

FROM THE FIELD OF MEDICAL EDUCATION

Medical schools will hereafter have to require three years of premedical education of its students if they wish to remain on the list of accredited medical colleges. This action was taken at a meeting of the council on medical education on December 10, 1939.

The council is now working extensively in the field of graduate education for physicians, in cooperation with the special examining boards that have been set up in recent years for examination and certification of specialists. Just now these groups are studying opportunities for hospital training that will help prepare young physicians to take the examinations of the various boards. A recent study begun by the council concerns the health of interns, with a special interest in finding how many develop tuberculosis.

The annual registration of approved hospitals, made by the council, showed 6,226 institutions with a bed capacity of 1,195,026 and 58,764 bassinets and an average daily occupancy of 996,483.

SCIENTIFIC EVENTS

ADVISORY RESEARCH COUNCIL OF THE
CHEMICAL SOCIETY, LONDON¹

At the annual general meeting of the Chemical Society held on April 4, the president, Sir Robert Robinson, dealt at some length with the activities of the Advisory Research Council of the Chemical Society which was formed in September, 1939, its object being to act as a liaison between chemists engaged in unremunerated research who are seeking guidance as to subjects for investigation of potential value to the national war effort and government departments or industrial organizations in a position to suggest such topics. Sir Robert said that the response to the suggestions made and invitations issued by the Advisory Research Council has been very gratifying, and that he is sure that the initiative will continue to receive the generous support of the society's fellows. The situation in regard to scientific research in its application to the war is very different from that of 1914. This is due, partly to the effort made in the War of 1914-18 itself, partly to the intensive work of the intervening years, and in part to the unanticipated course of the present emergency, which has not yet thrown up so many new problems as might have been expected. Nevertheless, there are clear indications that the original work of research chemists will be needed in the present struggle, possibly to a greater extent than in the past, and the relative slowness of the start should deceive nobody in regard to the vitally important part which may be played by the Chemical Society. Certain research committees under Government auspices are already showing a marked tendency to make full use of the society's facilities in connection with the longer-range investigations in which they are interested.

It has been laid down by the Advisory Research Council of the Chemical Society that the only subjects to be studied should be such as have a definite relation to the conduct of the war. It is, however, generally agreed that the maintenance of our export trade in a flourishing condition is of the utmost importance, and therefore the council is prepared to assist the chemical industry so far as lies in its power. Here the attack must be on a broad front and, as it is impossible to spot the winners before the race, there must be losers also. Cooperative effort is essential, and this reflection should console those who are unable to see in what way the suggestions made to them could have any influence on the fortunes of the nation. Fellows may rest assured that more urgent needs will be made known to them when they become apparent to the council, and all suggestions of a specific nature are

welcomed and carefully examined. The council does not supervise or direct work undertaken at its suggestion, and the results may be used or published in any way that the investigator desires, subject of course to his own private commitments to firms which may have given material assistance or confidential information. Similarly, it can accept no responsibility for the accuracy of the work or for losses sustained or accidents to personnel. As an advisory body the council is prepared to give any assistance in its power to investigators who wish to ensure that their work is utilized to the full in the national interest. When work is undertaken on behalf of a government department, this fact is clearly stated, and fellows need not be reminded of the existence of the Official Secrets Act. The council has no funds at its disposal, but workers on projects suggested by the council may make application at any time to the research fund committee of the society. Finally, Sir Robert emphasized that the council is always available for consultation if any fellow is doubtful of the proper procedure at any stage of his work.

FIELD WORK OF THE U. S. GEOLOGICAL
SURVEY

THIS season's geologic field work of the U. S. Geological Survey, already under way or soon to begin, includes the following projects:

Studies of Pleistocene deposits and of faulting of the intermontane basins, mainly in that part of Montana west of Butte, by J. T. Pardee, who will also give attention to manganese in the Philipsburg district in connection with drilling of the deposits by the Bureau of Mines, under the strategic minerals program.

An examination of the Ivanhoe mercury district, near Winnemucca, Nev., R. J. Roberts.

A study of the Coso quicksilver district, Inyo County, Calif., by C. P. Ross, who later in the summer will probably make examinations of mercury districts in southeastern Oregon and adjacent parts of Nevada, including the Bretz and Opalite properties in Oregon and the Cordero property in Nevada, in addition to prospects on and south of Steens Mountain, Ore.

An extension by Eugene Callaghan of the areal map previously prepared by him of the Marysvale alunite region, southwest-central Utah.

Resumption of a study of the geology and mineral deposits of the Irwin quadrangle, Ida.-Wyo., by L. S. Gardner.

A study by W. C. Warren of the stratigraphy and structure of the Forks area on the west slope of the Olympic Mountains, Washington, with special attention to its petroleum possibilities.

¹ From *Nature*.

A field examination of the coal lands in southwestern Powder River County, Montana, by R. P. Bryson.

Continuation of field work on the west side of the Big Horn Basin, Wyoming, by W. G. Pierce, who plans to extend westward the mapping in Sunlight Basin to include the remainder of the sedimentary rocks not covered by volcanics, and to extend mapping of the Heart Mountain thrust northwestward up Clark Fork Valley.

An investigation of the stratigraphy and fuel resources of the Durango and Red Mesa quadrangles, Colorado, by C. H. Dane.

Continuation of the examination by A. A. Baker of the geology and mineral resources of the Wasatch Mountains-Strawberry Valley region east of Provo, Utah.

Resumption of field work under the supervision of L. W. Currier in the Lowell and Blue Hill quadrangles, the Cape Cod area and in western Massachusetts, in cooperation with the State Department of Public Works.

Continued investigation of the tin resources of the York region, western Seward Peninsula, Alaska, by J. B. Mertie, Jr.

Geologic investigations in a number of Alaskan areas, including portions of the Copper River, upper Yukon and Juneau districts, by J. S. Williams.

An investigation of the chromite deposits of southwestern Kenai Peninsula, Alaska, by P. W. Guild.

SYMPOSIUM ON QUANTITATIVE BIOLOGY OF THE BIOLOGICAL LABORATORY, COLD SPRING HARBOR

As part of its policy of fostering a closer relation between biology and the basic sciences, the Cold Spring Harbor Biological Laboratory invites each summer a group actively interested in a specific aspect of quantitative biology, or in methods and theories applicable to it, to carry on their work and to take part in a symposium at the laboratory. The aim is that every important aspect of a given subject should be adequately represented, from the physical and chemical, as well as from the biological point of view. The symposium this year will deal with permeability. The participants will be in residence at Cold Spring Harbor during all, or an appreciable part, of the five weeks' period.

Investigators interested may attend and take part in the discussion of papers without further invitation. Those coming from a distance should make certain that there has been no change in the program. Those planning to stay at the laboratory over night or longer should make arrangements in advance. Those not able to attend, but wishing to contribute to the discussion may, upon communication with Dr. Eric Ponder, at the

laboratory, receive copies of manuscripts, and send their discussion by mail.

The symposium lasts from June 18 to July 17. Each day's program begins at 10:30 A.M. When two papers are scheduled for the same day, the second one will be read at 2:15 P.M.

Those taking parts in the symposium include Kenneth C. Blanchard, New York University; Arthur K. Parpart and A. J. Dziemian, Princeton University; N. Rashevsky, University of Chicago; M. H. Jacobs, University of Pennsylvania; Rudolf Höber, University of Pennsylvania; W. J. V. Osterhout, the Rockefeller Institute for Medical Research; Henry B. Ball, Northwestern University Medical School; Harold A. Abramson, Manuel Gorin and Eric Ponder, College of Physicians and Surgeons, Columbia University, and the Biological Laboratory; Hans Neurath, Duke University School of Medicine; Francis O. Schmitt, David F. Waugh and Kenneth J. Palmer, Washington University, St. Louis; G. W. Scarth, J. Levitt and D. Siminovich, McGill University; Kenneth S. Cole, College of Physicians and Surgeons, Columbia University; Balduin Lucké, University of Pennsylvania; M. J. Kopac, New York University; Robert Chambers, New York University; S. C. Brooks, University of California; D. R. Hoagland, University of California; Daniel Mazia, University of Missouri; L. R. Blinks, Stanford University; B. W. Zweifach, New York University; Robert F. Furchgott, Northwestern University Medical School; H. Burr Steinbach, Columbia University; Hugh Davson, Dalhousie University, and John Seudler, College of Physicians and Surgeons, Columbia University.

The papers of these Symposia, together with edited discussions, are published as Cold Spring Harbor Symposia on Quantitative Biology.

HONORARY DEGREES CONFERRED BY PRINCETON UNIVERSITY

AMONG honorary degrees conferred at the commencement exercises of Princeton University on June 11 was the doctorate of science on Dr. John Howard Northrop, the doctorate of letters on Dr. Arthur Oncken Lovejoy and the doctorate of laws on Dr. Abraham Flexner. The candidates for honorary degrees were presented to President Dodds by Professor Luther P. Eisenhart, dean of the Graduate School.

The citations follow:

DOCTOR OF SCIENCE

John Howard Northrop, member of the Rockefeller Institute for Medical Research in Princeton; a graduate of Columbia and member of the National Academy of Sciences; awarded the Stevens Prize and the Chandler Medal in recognition of his contributions to the physiology of living cells, his success in the crystallization of en-

zymes, and his analysis of their biological activity and chemical identity; his recent investigations of the nature and activity of bacteriophage have led to a better understanding of this important biological and chemical problem; a biochemist of the first rank, a dexterous technician in his art and a master in his science.

DOCTOR OF LETTERS

Arthur Oncken Lovejoy, professor of philosophy emeritus of the Johns Hopkins University after twenty-five years of service; past president of the American Philosophical Association, an organizer and a president of the American Association of University Professors; his many articles and books dealing with philosophy and the history of thought, notably "The Great Chain of Being," and "Primitivism and Related Ideas in Antiquity," attest to his high quality as a scholar; a philosopher with a catholicity of knowledge, and a singular power of analysis and criticism, a humanist deeply interested in the history of ideas in whatever field.

DOCTOR OF LAWS

Abraham Flexner, creator and until recently director of the Institute for Advanced Study; a graduate of the Johns Hopkins University in the early years of that institution; his reports upon medical education in this country as an expert of the Carnegie Foundation for the Advancement of Teaching and his labors in the Division of Medical Studies of the General Education Board resulted in fundamental reform in medical education in the United States; critic of education and author of books on colleges and universities in this country and in Europe, he dreamed of a new type of institution of higher learning, and his dream has come true in the institute nearby.

RECENT DEATHS AND MEMORIALS

DR. GEORGE G. SEARS, emeritus professor of medicine of the Harvard Medical School, died on May 27 in his eighty-first year.

DR. WILLIAM MCCrackEN, professor of chemistry at the Western State Teachers College, Kalamazoo, Mich., died on June 13, at the age of seventy-six years.

CAROLINE SHELDON MOORE, since 1921 associate professor of biology, University of Redlands (Calif.), died on May 22 at the age of sixty-nine years.

DR. DAVID PERLA, since 1927 associate pathologist and immunologist at Montefiore Hospital, New York City, died on June 14 in his fortieth year.

THE death is announced of Roger Smith, formerly of the Great Western Railway Company, past-president of the British Institution of Electrical Engineers, at the age of seventy-seven years.

CEREMONIES were held on June 1 at the State College of Washington in dedication of a granite block and bronze tablet to the memory of Dr. William J. Spillman, who originated the first hybrid wheats at the Washington Agricultural Experiment Station and in 1900 and 1901 independently rediscovered Mendel's Law of Recombination. The boulder marks the site of his experimental plots where, at his request, his ashes were placed following his death in 1931. When his wife, Mattie Ramsay Spillman, died in 1935, her ashes were placed with those of her husband. A bronze tablet in their memory is being placed in James Wilson Hall, the agricultural building. Dr. Spillman was agriculturist on the staff of the "Agricultural College, Experiment Station, and School of Science" from 1894 to 1901, immediately preceding his career with the U. S. Department of Agriculture. At the exercises, addresses of tribute to Dr. Spillman were delivered by Dr. E. O. Holland, president of the State College of Washington, and Edward C. Johnson, dean of the College of Agriculture and director of the Agricultural Experiment Station.

A PORTRAIT of Professor Benjamin Silliman (1779-1864), the American physicist, by Samuel F. B. Morse, inventor of the telegraph, has been acquired by Yale University. The acquisition was made possible by the generosity of a graduate of Yale, who purchased the portrait. The picture was formerly owned by the Nantucket Athenaeum, Nantucket, Mass. The canvas, fifty-six by forty-four inches, was painted in 1825. Considered a fine example of the work of Morse as a painter, it shows Professor Silliman in a black coat standing behind a marble-top table as though delivering a lecture. His left hand rests on some books, while his right hand holds a piece of mineral. Various other minerals are scattered on the table, and a red curtain at the left, and East Rock, New Haven, at the right, form the background. The portrait is to be placed in a wall panel designed for it in Silliman College.

SCIENTIFIC NOTES AND NEWS

THE American Association for the Advancement of Science has this week been holding its one hundred and sixth meeting in Seattle, Washington, under the presidency of Dr. Albert F. Blakeslee, director of the department of genetics of the Carnegie Institution of Washington. The Pacific Division is holding its twenty-fourth meeting at Seattle, with Dr. Lewis M.

Terman, professor of psychology of Stanford University, as president. Twenty-seven independent and affiliated societies are participating in the meeting. A preliminary announcement by Dr. F. R. Moulton, permanent secretary of the association, is printed in SCIENCE for May 17; a full report will appear in an early issue.

DR. FRANK HOWARD LAHEY, of Boston, director of surgery at the Lahey Clinic, formerly professor of surgery at the Medical School of Tufts College, was elected at the New York meeting president of the American Medical Association. Dr. Parke G. Smith, of Cincinnati, was elected vice-president.

At the commencement exercises of the University of Pennsylvania the degree of doctor of science was conferred on Dr. John Alexander, professor of surgery at the University of Michigan; on Dr. Clarence E. McClung, retiring professor of zoology and director of the Zoological Laboratory of the University of Pennsylvania, and on Dr. George H. Meeker, professor of biochemistry and dean of the Graduate School of Medicine at the university. The degree of doctor of laws was conferred on Dr. John A. Schaeffer, president of Franklin and Marshall College, formerly vice-president and director of research of the Eagle-Picher Lead Company.

WASHINGTON UNIVERSITY, St. Louis, at its seventy-ninth commencement on June 11 conferred the degree of doctor of laws on Dr. Herbert Spencer Gasser, director of the Rockefeller Institute for Medical Research; on Dr. Eugene Lindsay Opie, professor of pathology at Cornell University Medical College, and on Dr. Walter Bradford Cannon, professor of physiology at Harvard University, retiring president of the American Association for the Advancement of Science, who gave the principal address. The degree of doctor of science was conferred on Dr. Edward Adelbert Doisy, professor of medicine at the School of Medicine of St. Louis University.

LEHIGH UNIVERSITY conferred at commencement on June 10 the honorary degree of doctor of engineering on Dr. Alexander G. Christie, president of the American Society of Mechanical Engineers and head of the department of mechanical engineering at the Johns Hopkins University.

DR. THOMAS HARPER GOODSPEED, professor of botany and director of the botanical gardens of the University of California, was given the honorary degree of doctor of science by Brown University on June 17 "in recognition of distinguished service in his chosen field, rendered by an alumnus of Brown University."

At Union College, Schenectady, N. Y., the degree of doctor of science has been conferred on Dr. Saul Dushman, associate director of the General Electric Research Laboratory, Schenectady, N. Y.; on Le Roy Odell, Pan American Airways engineer; on Arthur C. Parker, archeologist and director of Rochester Municipal Museum, and on John Albertson Sampson, gynecologist.

THE Linnean Society medal was presented on May 24 to Sir Arthur Smith Woodward, from 1901 to 1924

keeper of the geological department of the British Museum. The Crisp award and medal were presented to D. J. Scourfield in recognition of the importance of his paper on "The Oldest Known Fossil Insect," recently read before the society.

LE DUC DE BROGLIE, member of the French Academy, distinguished for his work on x-rays and x-ray spectroscopy, has been elected a foreign member of the Royal Society, London.

THE College of Physicians of Philadelphia has awarded the Alvarenga Prize to Dr. E. Goodpasture, professor of pathology at Vanderbilt University, "for his outstanding contributions to the knowledge of viruses." This prize was established by the will of Pedro Francisco da Costa Alvarenga, of Lisbon, Portugal, an associate fellow of the College of Physicians, and is awarded annually by the College of Physicians "on each anniversary of the death of the testator, to the author of the best memorial upon any branch of medicine, which may be deemed worthy of the prize."

THE first annual Jewish Veterans award for American leadership was presented at a luncheon given on June 10 in New York City to Dr. James Bryant Conant, president of Harvard University, in recognition of his "courageous devotion to the cause of humanity and intellectual freedom."

MEDALS awarded by the American Medical Association for scientific exhibits at the recent New York meeting included: a gold medal to Dr. Charles B. Huggins, Philip Clark and W. W. Scott, of the University of Chicago, for an exhibit illustrating experimental benign hypertrophy of the prostate in the dog; a silver medal to Dr. John R. Paul and Dr. James D. Trask, of the School of Medicine of Yale University, for an exhibit illustrating a rural epidemic of poliomyelitis, clinical and geographical features, and a bronze medal to Charles F. Nelson and Roland C. Nelson, of the Nelson Clinic, Beverly Hills, Calif., for an exhibit on bone metabolism.

DR. MARSTON TAYLOR BOGERT, past president of the Chemists' Club, only survivor of the original incorporators of the club, was the guest of honor at a dinner given on May 24 to mark his election to honorary membership in the club. Dr. F. C. Whitmore, of the Pennsylvania State College, presided. Other speakers were Dr. Leo H. Baekeland and Dr. Harry L. Fisher. A scroll in token of Dr. Bogert's election to honorary membership was presented to him at the dinner, which was attended by more than a hundred members and guests.

PROFESSOR LAO G. SIMONS, chairman of the department of mathematics at Hunter College, who is retiring after forty-five years of service, was guest of her

colleagues and friends at a dinner held in her honor on June 18. President George N. Shuster was the toastmaster. Mrs. Jewell Hughes Bushey, associate professor, has been elected chairman of the department.

DR. WILLIAM M. BARR, chief chemical and metallurgical engineer of the Union Pacific Railroad Company, has been nominated for president of the American Society for Testing Materials. Herbert J. Bell, head of the department of textile engineering of Lowell Textile Institute, Mass., has been nominated for vice-president.

OFFICERS of the Electrochemical Society include: *President*, Dr. Frank C. Mathers, Indiana University; *Past-president*, Dr. H. Jermain Creighton, Swarthmore College, and *Vice-presidents*, D. A. Pritchard, Dr. Alexander Lowy, J. D. Edwards, E. M. Baker, G. B. Hogaboom, Sr., and Dr. M. de K. Thompson. The next convention of the society will be held in Ottawa, in the Hotel Chateau Laurier from October 2-5.

DR. WILLIAM DEB. MACNIDER, Kenan research professor of pharmacology in the Medical School of the University of North Carolina, who for the past three years has served as dean of the Medical School, has resigned from the deanship, his resignation to become effective on July 1.

DR. BASIL C. H. HARVEY, professor of anatomy and dean of students of the division of biological sciences of the University of Chicago, will become professor emeritus next September.

PROFESSOR CHARLES WILSON BROWN, chairman of the department of geology at Brown University, will retire at the close of the college year. He was appointed instructor in 1905, and since then has been connected with the department.

DR. BENJAMIN H. WILLIER, since 1933 head of the division of biological sciences at the University of Rochester, has been appointed Henry Walters professor of zoology at the Johns Hopkins University. He succeeds Dr. Herbert S. Jennings.

It is planned to divide the department of electrical engineering and physics of the Rensselaer Polytechnic Institute into two departments. Professor Matthew A. Hunter, in accordance with his long expressed desire, will be relieved of his duties as acting head, so that he can devote his full time to directing the department of metallurgical engineering. He has served for years in both capacities. Professor Wynant J. Williams becomes head of the new department of electrical engineering, and Professor Robert A. Patterson becomes head of the new department of physics.

DR. S. P. POOLE has been appointed to a professor-

ship of geography at Syracuse University, Dr. James E. Maynard to an associate professorship of geology, Dr. Eric Faigle to an associate professorship of geography. Dr. Joseph A. Russell has been made assistant professor of geography and Dr. John G. Broughton, instructor in geology.

DR. NORMAN CAMERON, formerly associate professor of psychology at Cornell University Medical College and assistant attending psychiatrist at the New York Hospital, has been appointed professor of psychology and chairman of the department of psychology at the University of Wisconsin. During the past year Dr. Cameron has been acting professor and acting chairman of the Department of Psychology at Wisconsin.

DR. HANS BETHE, professor of physics at Cornell University, has been granted a sabbatic leave from February, 1941, until February, 1942. He will spend the spring semester of 1941 at Columbia University, where he has been invited to lecture.

DR. KENNETH B. TURNER, assistant professor of medicine of the College of Physicians and Surgeons of Columbia University, was assigned to the School of Tropical Medicine during the month of May to assist in the reorganization of the University Hospital, which was reopened for service on March 18. Dr. Ramón M. Suárez has been appointed head of the department of clinical medicine. Dr. A. V. Hardy, of the DeLamar Institute of Public Health and Hygiene of Columbia University and a member of the National Advisory Council of the U. S. Public Health Service, has been promoted to an associate professorship in epidemiology. He will organize a department of post-graduate studies in public health within the school and will ultimately assume the direction of this department, which will be conducted in cooperation with the Insular Department of Health and the University of Puerto Rico.

DR. ARNOLD DEM. WELCH, instructor in pharmacology at Washington University School of Medicine, has become chief pharmacologist for Sharp and Dohme, Inc., with laboratories at the biological division in Glenolden, Pa.

DR. OSWALD SCHREINER has been appointed adviser on soil problems to Dr. E. C. Auchter, chief of the Bureau of Plant Industry.

DR. FREDERICK A. LINDEMANN, professor of experimental philosophy at the University of Oxford, has been appointed adviser concerning statistics and research to the Prime Minister of England.

THE officers, executive committee and members of the Division of Geology and Geography, National Research

Council, for the year beginning July 1, are as follows: *Chairman*, Walter H. Bucher; *Vice-chairman*, Richard Hartshorne, *Executive Committee*, Walter H. Bucher, Richard Hartshorne, Norman L. Bowen, Wilmot H. Bradley, Charles B. Hitchcock, A. I. Levorsen; *Representatives of Societies*, Wilmot H. Bradley and Stephen R. Capps—Geological Society of America; George Tunell—Mineralogical Society of America; Charles E. Resser—Paleontological Society; Richard Hartshorne and C. Warren Thornthwaite—Association of American Geographers; Charles B. Hitchcock—American Geographical Society; W. S. Burbank—Society of Economic Geologists; Robert B. Sosman—American Ceramic Society; A. I. Levorsen—American Association of Petroleum Geologists; *Members at Large*, Norman L. Bowen, Walter H. Bucher and Charles C. Colby.

THE sixty-fourth meeting of the American Astronomical Society will be held at Wellesley College from September 11 to 14.

The Australian Journal of Science announces that the Adelaide meeting of the Australian and New Zealand Association for the Advancement of Science will open on August 19. Social functions will be restricted, but sectional excursions will afford members opportunity for meeting together informally. It is hoped that longer excursions to places of scientific and industrial interest may be arranged in cooperation with the South Australian Tourist Bureau and the companies and departments concerned. The incoming president will be Dr. Patrick Marshall, testing officer in the Public Works Department, New Zealand. He succeeds the late Sir Ernest Scott.

Nature states that an Austrian Academy in Great Britain has been founded, the honorary president of which is Sir George Franckenstein, formerly Austrian Minister in Great Britain. The academy is arranging lectures, which will be delivered, as a rule, in English,

and will be open to the public, on Austrian culture, and it is hoped to organize exhibitions and other activities in collaboration with the Austrian Circle for Arts and Sciences. The inaugural meeting of the academy was held at the Royal Institution on May 2; among the speakers were Professor Gilbert Murray, Professor E. Schrödinger (for the Austrian Academy) and Sir William Bragg. A "Society of Friends of the Austrian Academy" has been established to collaborate with the academy and to further its scientific and cultural activities. Members of the society will be admitted free of charge to all regular lectures, and will have special privileges for other functions arranged by the academy. According to the official statement the object of the academy is to "furnish a means for the many exiled scholars and artists at present in England to spread the knowledge of Austrian culture and achievement and to continue their work in art and music."

THE endowment for the Arno B. Luckhardt Fellowship Fund, started in 1932, has now, through contributions from former students, colleagues and other friends of Dr. Luckhardt and the aid of the University of Chicago, reached the sum of \$25,000. This will yield an annual income of about \$1,000. This fellowship is administered by the department of physiology. Dr. Alexander Rush, great-great-grandson of Dr. Benjamin Rush, has been appointed fellow for next year.

IN the issue of *SCIENCE* for May 10, page 443, in the article entitled "Expeditions of the Smithsonian Institution" the statement is made that Rose Atoll belongs to the Phoenix Group and that Tau Island is an atoll. Rose Atoll belongs to the Samoan Group and Tau Island is not an atoll but a high volcanic island. The errors indicated do not occur in the original publication but were inadvertently included by the correspondent who prepared the press release.

DISCUSSION

WHAT IS A "PRE-AMERINDIAN"?

DESPITE its obvious usefulness the term "Amerind," suggested in 1899 by Major Powell as a substitute for the inappropriate terms used to designate the race of man inhabiting the New World before its occupancy by Europeans, has strangely enough found scant favor. Its meaning, however, is clear, referring as it does to the various physical types incorporated into and ancestral to the American Indian. Recently, Dr. Kirk Bryan has several times employed the term "Pre-Amerindian" in referring to the Folsom and other lithic horizons, some of which have been found in association with extinct animals.¹ Since no human

remains have yet been found in America which represent any ancient type radically different from portions of the variable modern Indian population there seems as yet no biological justification for such usage. Dr. Bryan, however, seems to base his case mainly on cultural evidence, since he believes the Folsom and other cultural complexes are genetically different from those of the "late Neolithic American Indian" (1940, p. 1). If this were actually the case there would indeed be an excellent chance that "Folsom man," when he is finally found in association with such artifacts, might prove to be a widely divergent and unique physical type. However, Dr. Bryan's conception of the Ameri-

¹ *SCIENCE*, 87: 2259, 343-346, April 15, 1938. *Bull. Texas Archeol. and Paleont. Soc.*, 11: 9-42, September,

1939; and Kirk Bryan and Lewis F. Ray, *Smithsonian Miscellaneous Collections*, 99: 2, 1940.

an Indian seems only to include New World horticultural and ceramic cultures of more advanced type and ignore both the contemporary marginal gatherers and hunters and the intermediate lithic horizons as well.

Actually, every major artifact type recovered at the Lindenmeier-Folsom site finds a close analogue, and possibly homologue, in hammer, grinder, chopper, scraper, drill, knife and projectile point types from the lowest level (I) at the nearby Signal Butte site.² This is not merely a resemblance in individual specimens but in whole classes of artifacts and techniques. Stone work, simple geometric art and use of mineral pigments, as well as the basic hunting economy, are the same. Many of these generic similarities, included in the ancient Lake Mohave culture as well, have also been pointed out by Amsden.³ In addition, Kidder, Howard and myself have indicated the manner in which the later Signal Butte and other intermediate horizons inadequately, but definitely, link the earliest clearly defined lithic and the later ceramic horizons in North America.⁴ Since Dr. Roberts has never referred to the Signal Butte deposits, nor made any comparisons between Lindenmeier and Signal Butte I culture complexes,⁵ Dr. Bryan is perhaps unaware of the basic cultural similarities and sequences involved. Because Signal Butte I lacks positive evidence of extinct bison as well as completely fluted points, and includes other artifact types as well, it would seem to be a somewhat later descendant of the culture represented at the Lindenmeier site. This, in connection with the upper stratified horizons, is extremely important, since it gives us a clear indication of sequence, and culture sequence must always be the backbone of archeology. This brings up a matter of method and archeological technique which appears to have more than passing significance.

Of recent years numerous archeologists have temporarily shifted their attention from prehistoric horizons of unknown age and affiliations to early historic and documented sites. These have been excavated in order to proceed from the known into the hitherto unknown. Such excavations objectively link history with prehistory and anchor archeology to meaningful social science. Meanwhile, other archeologists, and especially geologists and paleontologists, have been interested in the problem of early man in America. They

have concentrated on such early horizons and have often evinced little interest in anything not demonstrably "ancient." As a result, archeological problems in the New World are being attacked from both ends, thus creating a largely artificial hiatus between the two fields of concentration or interest. Presumably, the two attacks will eventually meet, but the present situation is scientifically unfortunate in that it leads those not too familiar with the complex and extensive cultural evidence to postulate absolute non-conformity between various lithic and ceramic horizons in America.

Actually there is no positive evidence of such a state of affairs in the New World. Only by stressing negative evidence can such a view-point be suggested. The only human skeletal remains actually found in association with cultural evidence and extinct animals, the horse and the ground sloth, are described by Dr. H. L. Shapiro as a "not especially primitive type" conforming to Indian characteristics and resembling in some traits the Lagoa Santa skulls.⁶ Further, these extremely important but little publicized discoveries of Bird in Patagonia and Tierra del Fuego reveal a sequence of lithic and bone industries extending from this early faunal association up to the historic hunting and fishing cultures of the Ona and Yahgan. The succession of lithic types is, in general characteristics, surprisingly similar to that in the longer but less complete cultural sequence from Folsom to the historic in the central Great Plains. Considering the distances involved these correspondences are especially striking. Obviously in the older deposits one would expect somewhat more primitive, or at least earlier, physical types, as is actually the case in the south Patagonian, Punin, Lagoa Santa and Pericue crania. In regard to the much publicized "Minnesota Man" even this evidence is highly debatable, whereas the cultural materials found in association most strongly suggest a relatively late Mississippi culture burial. A trend in predominance from early dolichocephaly to later brachycephaly is well known in the New World, but this does not indicate any clear hiatus between an ancestral "Amerind" and an alien "Pre-Amerindian." Similarly, early and late cultural connections have also been demonstrated in those few areas where adequate work stressing sequence equally with antiquity has been accomplished.

A tremendous amount of such research remains to be done in filling in these bare outlines and establishing others. The field is crying for even closer cooperation between geologist and archeologist. Already far-reaching results have been attained. Such cooperation has converted knowledge of late Pleistocene or early Recent occupation in the New World from pure hypothesis to objective fact. It seems foolish to obscure the emerg-

⁶ Junius Bird, *The Geographic Review*, 28: 2, 250-275, April, 1938.

² W. D. Strong, *Smithsonian Miscellaneous Collections*, 3: 10, 224-239, 1935, pls. 23 and 25.

³ C. A. Amsden and others, *Southwest Museum Papers*, No. 11, pp. 92-95, Los Angeles, 1937.

⁴ A. V. Kidder, "Speculations on New World Prehistory, Essays in Anthropology," presented to A. L. Kroeber, Berkeley, 1936, p. 144; E. B. Howard, *The Museum Journal*, 24: 2-3, 150, 1935; W. D. Strong, *op. cit.*, pp. 278-282.

⁵ F. H. H. Roberts, Jr., *Smithsonian Report for 1938*, pp. 531-546, 1939, and earlier papers.

ing picture by emphasizing antiquity and ignoring all evidence of sequence. In final analysis, relative dating of the earlier finds will always depend upon agreement among geologists, cultural and racial significance upon the findings of anthropologists. In this last regard it appears to the writer, and he believes the majority of physical and cultural anthropologists will agree, that whereas the use of the term "Amerind" is a matter of personal choice, the use of the term "Pre-Amerindian" is still unjustified on the basis of the known physical and cultural evidence. Since such usage and the selective attitude producing it seem to carry very important theoretical and methodological correlates the matter is one of far deeper significance than mere terminology.

WM. DUNCAN STRONG

COLUMBIA UNIVERSITY

ANNUAL HONORARY JUNIOR MEMBERSHIP AWARDS

THE Academy Conference of the American Association for the Advancement of Science has been deeply interested in the work of the several junior academies of science. The conference has in various ways encouraged the work of the junior groups. In 1938, the council of the American Association for the Advancement of Science voted to recognize outstanding work of younger scientists by providing two honorary annual junior memberships in the American Association for the Advancement of Science to each affiliated senior academy which sponsors a junior academy of science. The procedure in selecting the recipients for these awards was left entirely with the senior and junior academies. The only restriction imposed was that the awards were to be given to one boy and one girl in each state upon the recommendation of the senior academy. Since in some cases the senior academy as a whole is not directly connected with high-school work, the selection of the candidates for the honorary awards has been supervised by the senior sponsors of the junior academy.

In an attempt to give significance to the honorary junior membership award the advisory committee of the Pennsylvania Junior Academy of Science has evolved a procedure which might be of interest to other junior academies. At the annual state meeting of the junior academy the various clubs with their sponsors and officers listen carefully to the papers presented. On the basis of an open election by membership clubs the boy and girl candidates are nominated. Each club represented at the meeting is permitted but one vote. Following this election the advisers judge the election as to the worthiness of the candidates who have been recommended. The senior academy officials are then notified, and they make the recommendation to the American Association for the Advancement of Science.

To further the importance of the award in Pennsylvania, the chairman of the advisory committee, when he could do so, has made the presentation of the certificate of membership in person at a school assembly. Usually this is preceded or followed by a short address to the student body on some general phase of science. In this way the attention of the entire school is called to the work of the American Association for the Advancement of Science in connection with secondary schools. This method of presentation has been followed with gratifying results.

The high caliber of the students selected for the award in Pennsylvania is attested by the fact that both of the honorary members this year have received scholarships for college work. The boy recipient received his as a direct result of his fine presentation of a cosmic ray counter at the annual meeting of the junior academy.

Unfortunately, the expenses for traveling to the schools to make the presentation has come from the pockets of those presenting the awards and from an officer of the association who has been most enthusiastic about the work of the junior academies.

OTIS W. CALDWELL

KARL F. OERLEIN

PEACE RESOLUTION OF THE AMERICAN ASSOCIATION OF SCIENTIFIC WORKERS

MANY scientists in this country have hoped that mature consideration of the social relations of science, prior to the arrival of acute emergencies, such as those which broke the spirit of German science, would enable scientists to direct their collective influence, when crises do develop, on the side of those human and intellectual values upon which all scientific accomplishment is predicated. Such considerations have led to the formation, and rapid growth, of the American Association of Scientific Workers.

A peace resolution circulated by this organization has met an amazingly enthusiastic reception by leading scientists and other scientific workers throughout the country. It has also elicited some criticism, along the lines of Dr. Sturtevant's communication to *SCIENCE* (May 24), on the assumption that it states a position of uncompromising pacifism.

I write this letter, as a vice-president of the A.A.S.W. and as one who was active in preparing the resolution, to help allay this incipient misunderstanding. (See also letters by Drs. Carlson and Mulliken, *SCIENCE*, May 31.) As a matter of simple fact, the Chicago group of nearly a dozen scientists which, in committee, over three months ago, approved the statement in its present form, rejected another wording which implied an unqualified isolationist position. A majority of this particular committee was, even then,

prepared to consider approval of intervention by the United States in the present war, should events march in certain ways. The only legitimate objection, I believe, that might be raised to the resolution as it stands, is that it really does *not* take a very positive position one way or the other. The excuse for its existence, none the less, would be that only by starting collective thinking on this problem by scientists can we hope for a reasoned group stand by them.

I trust that Dr. Sturtevant, and the others who have made his initial interpretation of the resolution, will be reassured by the word "reasonable"—a dear one to science—in, "... all reasonable programs which seek ...," and join many hundreds of their colleagues in furthering the association.

R. W. GERARD

UNIVERSITY OF CHICAGO

ON March 4, the Boston-Cambridge Branch of the American Association of Scientific Workers passed a resolution which recommended "The wholehearted and unceasing support of all reasonable programs which seek a better understanding of the causes of war, and which will preserve peace for the United States and bring peace to the world."

This resolution was passed at a meeting attended, as is usual, by a small minority of the enrolled membership. When it was circulated among the approximately 180 members of the branch, only 62 favorable replies were received. In addition there were a number of letters of protest. It can not be stated, therefore, that this resolution expressed adequately the position of a majority of the members even in March, much less that it expresses their position now.

Recently this resolution has received considerable publicity. Among other things it has been accused of stating a "peace at any price" policy. This is untrue. It states, if anything, a "peace—it's wonderful" policy. This is at once the worst and the best that can be said of it.

Early in 1939 the Boston-Cambridge Branch of the American Association of Scientific Workers declared that "In view of the extensive and cruel persecution of scientists in Germany for religious and political reasons, of the evidence brought out by our own study that the whole structure of German science, once so notable, has been undermined and partially destroyed," it resolved "to cease as far as is possible the purchase of scientific materials and apparatus manufactured in Germany." The resolution stated further, "We believe that this action is the least that can be taken as a protest," and that it would "in its small way contribute towards the cause of world peace."

The events of the past few months have demonstrated the ludicrous ineffectiveness of such measures. The Nazi system against which the boycott resolution

was directed has since extended its dominion by brutal aggressions which feature the perversion of science and technology to promote destruction on an unprecedented scale.

In characterizing its anti-Nazi boycott as "the least" action that it could have adopted, this organization clearly envisaged the application of more powerful measures. These have since been undertaken by the Allied governments.

In pursuance therefore of this expressed policy, the undersigned members of the Boston-Cambridge Branch of the Association of Scientific Workers urge the United States Government to take all steps necessary for hemisphere defense, including such aid to the Allies as most effectively furthers this aim. We believe this now to represent the most "reasonable program . . . which will preserve peace for the United States and bring peace to the world."

No attempt has been made to canvass the entire membership on this issue. In view, however, of misunderstandings concerning the previous resolution, the fact that the organization does not meet during the summer and the critical pressure of world events, the undersigned members believe it necessary to state their personal views on this situation immediately.

(Signed)

FRANCIS BITTER, M. I. T.

WALTER B. CANNON, Harvard

ARTHUR L. COHEN, Harvard

KARL T. COMPTON, M. I. T.

ALBERT SPRAGUE COOLIDGE, Harvard

D. EUGENE COPELAND, Harvard

W. J. CROZIER, Harvard

ROBERT S. FRIEDMAN, Harvard

ROBERT GALAMBOS, Harvard

MARK GRAUBARD, Clark

DONALD R. GRIFFIN, Harvard

DAVID T. GRIGGS, Harvard

ZAREH HADIDIAN, Clark

HAROLD HASKIN, Harvard

WILLIAM C. HERRINGTON

HUDSON HOAGLAND, Clark

DAVID KAUFMAN, Harvard

G. B. KISTIAKOWSKY, Harvard

WALTER J. NICKERSON, Harvard

RICHARD R. OVERMAN, Harvard

GREGORY PINCUS, Clark

C. B. PURVES, M. I. T.

ALFRED C. REDFIELD, Harvard

GEORGE SASLOW, Harvard

H. J. SAWIN, Harvard

GEORGE T. SCOTT, Harvard

GRACE D. STERNE

KENNETH V. THIMANN, Harvard

RICHARD TITHERINGTON, Mass. D. P. W.

GEORGE WALD, Harvard

SCIENTIFIC BOOKS

CULTURAL DEVELOPMENT

Race, Language and Culture. By FRANZ BOAS. Pp. xx + 647. 90 illustrations. New York: The Macmillan Company. \$5.00.

THESE admirably selected papers, severally published between 1887 and 1939, constitute at once an epitome of Professor Boas's thinking and of the half-century's progress. In his earliest period, we learn, he recognized general laws of cultural development and, specifically, the universal priority of matrilineal descent, which he was one of the first to challenge (pp. 635, 637). Toward the turn of the century, Ehrenreich mingled linguistic with biological considerations in a classification of races (p. 408); Horatio Hale ascribed similarity in speech to similarity of geographical environment (p. 278), and Boas himself had to defend the statistical treatment of variable phenomena (p. 165).

No assortment of essays can produce the cumulative effect of Boas's monographs. But the chapters on "Growth" (p. 103), "Some Traits of the Dakota Language" (p. 226) and "The Relationship System of the Vandau" (p. 384) demonstrate his mastery of the several main divisions of anthropology, his "für die Anthropologie in allen ihren Zweigen so ausgezeichnete und wahrhaft förderliche Tätigkeit," as Waldeyer wrote in 1906.

From the articles on physical anthropology Boas emerges as anything but the arch-environmentalist of superficial critics. An early and appreciative reader of Galton and Pearson (p. 15), he never belittles heredity, pointing out, *e.g.*, that the *milieu* can not explain the differences between types which live under identical conditions (p. 167). The instability described in his study of immigrants is not tantamount to an inheritance of acquired characters, but corresponds to the botanist's "modifications" (p. 36). The cephalic index of American-born individuals differs from their parents', but would the difference persist in subsequent generations if transplanted to the homeland? The point is not whether environment can change an hereditary character, but whether the index is an hereditary constant.

What really divides Boas from biological fundamentalists is his immunity to fashions. That the constitution of an organism limits its plasticity is for him an empirical induction, which does not enthrone absolute permanence as an axiom. Similarly, he was one of the first to establish segregation in mixed marriages (p. 138), but he is still awaiting proof that the Mendelian ratios hold for normal human traits (p. 35). Such discrimination lends to Boas's writing its peculiar

flavor. He neither confounds congenital with hereditary features (pp. 37, 47) nor inborn individual with inborn racial differences (p. 10); identical measurements of members of distinct races, he insists, do not efface the distinctness of these individuals as biological samples (p. 180).

The same maturity pervades the treatment of language. Spirits craving bold genealogical syntheses chafe at the restrictions imposed by the principle of strict lexical correspondence. Only by chance, they chide, is historical evidence extant to prove the generally accepted affinity of Armenian with Indo-European; Boas's canons would bar such recognition. But Boas remains unperturbed: if evidence were lacking, we should simply have to forego a conclusion (p. 218).

This Virchowesque restraint, inevitably grating on Haeckelian temperaments, must not be mistaken for an incapacity to grasp resemblances. Boas was the first to indicate the similarities between Tlingit and Athabaskan; but where others forthwith assumed a genetic bond, he demanded further scrutiny (p. 343). Is there not an alternative interpretation? The grammatical features shared by these stocks may result from borrowing rather than from a common ancestry. There is the comparable case of kinship nomenclatures, whose principles of classification are undoubtedly shared by unrelated groups though the vocables for the degrees of kinship remain quite distinct (p. 215f). Moreover, there are problems galore that can be attacked with hope of definitive solution, say, the processes of dialectic differentiation or the varieties of linguistic categories. If specious synthesis is shunned, there is thus a compensatory widening of the intellectual horizon. This is not unimaginative negativism, but that "tätige Skepsis" of Goethe's which so powerfully stirred Thomas H. Huxley.

And in ethnology the attitude that confronts us is still the same as in Boas's philological and anthropometric research. Some have held this a reproach: stressing his initial training in physics, they suggest that his approach to culture is an unsuitably "scientific" one. This is surely a "psychologist's fallacy," for precisely the opposite holds true. When Boas concerns himself with, say, aboriginal art or literature, he never applies incongruous techniques and he explicitly avoids the objectives of mathematical generalization. Thus, this skilled biometrician deprecates the statistical treatment of cultural data; and, granting the reality of correlations obtained by simpler methods, he is rather frugal in indicating them (pp. 254, 257f., 309, 321). As for laws, the supposed physicist masquerading in ethnographer's clothing has progressively turned his back upon them. In 1888 their determination

seems "the greatest aim of our science" (p. 637); in 1896 historical inquiry in different regions with subsequent comparison of the processes of growth in each becomes the indispensable prerequisite to the discovery of laws, hence represents the immediate goal (p. 279); by 1920 the uniqueness of the several cultures is a dominant idea (p. 286); and in 1932 culture appears so complex that any generalizations about it are either truisms or spurious (p. 257f.).

Actually, the difference between the simpler data of physics and the complex phenomena of geography had impressed itself on Boas very early in his career (pp. 639-647). He thus came to distinguish as coordinate and mutually complementary the desire to merge a host of facts in a simple formula and the desire fully to understand a particular phenomenon in its unique individuality. The recurrent warning against identifying cultural features that are not at bottom comparable (pp. 258, 263) illustrates his tendency to apply to ethnography the geographer's rather than the physicist's point of view.

Boas is, indeed, preeminently scientific in his treatment of culture, but merely because here, too, he is concerned solely with ascertaining the truth, not with tickling aesthetic tastes or indulging in unchecked fancies. Hence the persistent coldness to ambitious schemes of historical reconstruction. "We desire to find uncontested evidence of transmission, not alone the possibility or plausibility of transmission" (p. 459). Hence also his refusal to make common cause with either extremist faction in the perennial dispute over independent evolution versus diffusion; both schools, he contends, proceed from arbitrary assumptions (p. 282). And, precisely as in linguistics, his mind is not cribbed by conventional ruts. He gives to

the threadbare theme an original twist by demonstrating convergence as an unsuspected third reality (pp. 263, 275, 299). As for diffusion, to ascertain its occurrence or direction—the task which exhausts most relevant efforts—is merely the first step. We must ask, which traits are borrowed, which are rejected, and why, and what further changes the innovation may stimulate (p. 291). The study of cultural transference thus merges in cultural dynamics. Characteristically, Boas has shifted his position at different periods, stressing real history as a corrective of evolutionary schemes and emphasizing the processes of growth when historical schematism was in retreat (p. 311).

Though Boas has been continuously interested in methodology, he has not elaborated comprehensive treatises on the order of Graebner's or Wilhelm Schmidt's, preferring to expound his standpoint in occasional papers carefully worked out according to the exigencies of the moment. This predilection inevitably leaves lacunae and even sporadic disharmonies. But this is of small moment. Counsels of perfection are cheap; what counts is the concrete practice of science. As Mach says of the founders of physics. "Noch ohne alle Methode, welche ja durch ihre Arbeit erst geschaffen wird, und die ohne Kenntnis ihrer Leistung immer unverstanden bleibt, fassen sie und bezwingen sie ihren Stoff and prägen ihm die begrifflichen Formen auf."

In the anthropological science of his time Boas has been the great exemplar, fearless of authority, relentlessly self-critical, driven by a sacred thirst to ever new Pierian springs, gaining ever deeper insights into the nature of man.

ROBERT H. LOWIE

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SPECIAL ARTICLES

RELATIVE OVERGROWTH OF THE CENTRAL NERVOUS SYSTEM IN VITAMIN A DEFICIENCY IN YOUNG RATS¹

THE EXPLANATION OF THE NEUROLOGICAL LESIONS OCCURRING IN THIS DEFICIENCY

THE relation of vitamin A to growth and function of the nervous system has remained unsolved although several laboratories have reported neurological lesions as a consequence of vitamin A deficiency.

We have been unable to produce neurological lesions by vitamin A deficiency in rats after normal growth had occurred up to an age of 10-12 weeks although the epithelial changes characteristic of the deficiency were invariably produced. However, ataxia and paralysis may be regularly produced in young rats if

¹ From the Department of Pathology, Harvard Medical School and the Harvard Dental School.

the deficiency is established at a sufficiently early age. Our procedure has been such as to prevent any considerable storage of vitamin A during the first three weeks of life and placing the rats on a completely deficient diet at 21 days of age. Ataxia and paralysis appear at about 50 days of age, shortly before cessation of growth, and are attended by degeneration of the peripheral nerves and of nerve fibers in various tracts of the spinal cord and in the cerebellar peduncles. The pattern of degeneration in the spinal cord is irregular, chiefly of ascending tracts and can not be correlated with our rather meager knowledge of the order of myelination which is wholly post-natal in the rat. The explanation has been found to be a relative overgrowth of the central nervous system resulting in mechanical damage and degeneration of nerve fibers. The earliest and most striking manifes-

tations are within the spinal canal and involve both anterior and posterior nerve roots.

The gross manifestations are: (1) extensive and striking herniations of the nerve roots into the intervertebral foramina distorting and, to some degree, displacing laterally the spinal ganglia; (2) herniations into the bodies of the vertebrae (ventral wall of spinal canal) which become symmetrically deeply pitted and filled with irregularly coiled nerve roots. The localization of these pits is probably due to the vascular cushion ventral to the nerve roots which enter the spinal ganglia. We believe that the veins in this location yield to the crowding and thus determine the regions of bone resorption; (3) increase in size of the contents of the cranium as evidenced thus far by—(a) the presence of herniations of the cerebrum, cerebellum, and posterior colliculus into the transverse venous sinus. These herniations presumably occur at the sites of arachnoidal villi. The most notable herniations are those of the cerebellum which enter the transverse sinus where the superior cerebellar veins open into it; (b) distortion of the brain, made conspicuous by moulding of the mid-brain and cerebellum and partial obliteration of the cisterna magna; (c) changes in the contours of the fossae of the floor of the skull, due to bone resorption.

Thus far no striking gross changes have been noted in the peripheral nerves. In some instances the optic nerves close to the eyeball have shown a symmetrical globoid enlargement.

As it is well known that growth of bone ceases with the establishment of vitamin A deficiency, the obvious explanation of the unequal growth is that the growth of the central nervous system continues after the growth of the skeleton has ceased. We have endeavored to test this by two procedures—(1) the study of rats whose growth has been retarded at an equal rate and degree through inadequate diet with full vitamin complement; (2) a study of rats retarded by riboflavin deficiency. In spite of the facts that these control rats paralleled in rate of weight increase and skeletal growth the A-deficient rats, no neurological lesions were produced and dissection showed normal relations of the nervous system to spinal canal and cranium. This was also true in rats where the stunting was severe and prolonged.

Experiments indicate that the unequal growth of bone and nerves occurs between the fortieth and sixtieth days of age. In a few experiments we have found that if vitamin A in the form of carotene is added to the diet at 42 days of age and the diet restricted in amount so that the growth parallels litter-mates in continued A deficiency, no manifestations of nervous lesions occur. The rats retained on the deficiency became paralyzed on about the fiftieth day.

On postmortem examination at 63 days of age, those given carotene showed either no changes in the central nervous system or only very slight evidences of beginning herniation of nerve roots, in contrast to the striking lesions found in the litter-mates maintained on the deficiency for the entire period.

The unequal growth is most strikingly exhibited in the lumbar and sacral regions. It is manifest, to some degree however, throughout the entire length of the spinal cord. Rough estimates would indicate that nerve trunks taking exit in the lower lumbar and sacral foramina may be 4–6 mms longer than the distance from their origins to the foramina of exit.

It is possible that the compression of the cerebrum and cerebellum may be responsible for degeneration of descending fibers in the cord. At present the evidence points to a marked predominance of ascending tract lesions. The consequence of the herniations is obviously essentially that of more or less complete transection of the nerve roots and the few microscopic studies made support this view. Evidences of regeneration of nerve fibers proximal to the cell of origin have been found to take place during the deficiency. Observations in gross indicate that small excrecences comparable to amputation neuromata are present. Extensive formations of this sort have been seen after a period of extended repair on diets containing carotene.

Elucidation of the significance of the above observations is being attempted through a series of experiments designed to give information concerning the normal growth relations of the central nervous system and bony enclosure. As no readily discernible changes in nerve cells of the central nervous system or spinal ganglia are to be found other than those explainable through mechanical factors, an obvious conclusion is that the growth and physiology of the nervous system is independent of vitamin A, although the possibility that vitamin A deficiency accelerates the growth of the central nervous system can not be definitely eliminated without further work.

S. B. WOLBACH
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EFFECTS OF STEROID GLYCOSIDES AND CORTIN ON INSULIN CONVULSIONS AND BLOOD SUGAR

PREVIOUS work from this laboratory has shown that extracts of beef adrenal cortex can affect both the blood sugar level and the electrolyte pattern of normal and adrenalectomized animals. Because our preparations were not pure substances, it could not be determined whether the effects were produced by one or several hormones. Nevertheless, our work presented evidence that the adrenal cortex was intimately con-

cerned with carbohydrate metabolism. The first step was the proof that the low blood sugars following adrenalectomy were due to the removal of the cortex and not of the medulla.¹ Subsequent work² showed that this fall in blood sugar of adrenalectomized cats could be prevented by our extract³ and that the blood sugar of normal animals could be elevated by the use of this extract. Removal of the adrenal cortex delays the recovery of normal blood sugar values after insulin to a greater extent than does the removal of the adrenal medulla.⁴

Recent experiments having shown the cortin-like effects of steroid glycosides on blood potassium,⁵ we next tried the effects of these substances in protecting against insulin convulsions and on the blood sugar level. Unpublished preliminary studies by Zwemer and Hrubetz on the prevention of blood sugar depression and insulin convulsions in rabbits by the use of adrenal cortex extract are in accord with recent work on rats which shows that an anti-insulin effect in regard to blood sugar⁶ and convulsions⁷ is obtained by previous treatment with adrenal cortex extract.

Experiments: We used a Rockland-Swiss strain of white mice weighing 16 to 24 grams in the particular groups tabulated. The animals were divided into small groups to facilitate accurate observations, individually marked and fasted for 18 hours previous to insulin injection. Strophanthin in oil was injected at the start of the fasting period; cortin or the aqueous solutions of glycosides were administered in 3 doses, at 6, 3 and 1 hours preceding the insulin injection. In studies on anaphylactic shock, we⁸ found that it was best to give the aqueous cortical extract protective dose from 2 to 6 hours before antigen. This timing is also important in protection against insulin. Controls were treated in an identical manner with the exception that no strophanthin or cortical extract was given. Following intraperitoneal administration of a lethal dose of insulin, the animals were kept at a constant environmental temperature of 36°-38° C. for a period of 2 hours (Hemmingsen test).

One series of control mice are listed in Table 1-A. A significant number of animals was protected by previous treatment with adrenal cortex extract (Table

¹ R. L. Zwemer, J. M. Smith and M. Shirley, *Anat. Rec.*, 45: 250, 1930.

² R. L. Zwemer and Ruth C. Sullivan, *Endocrinology*, 18: 730, 1934.

³ R. L. Zwemer, F. J. Agate, Jr. and H. A. Schroeder, *Proc. Soc. Exp. Biol. and Med.*, 29: 721, 1931.

⁴ T. F. Zucker and B. N. Berg, *Am. Jour. Physiol.*, 119: 531-48, 1937.

⁵ R. L. Zwemer and B. E. Lowenstein, *SCIENCE*, 91: 75, 1940.

⁶ H. Selye, *Proc. Soc. Exp. Biol. and Med.*, 42: 580, 1939.

⁷ H. Jensen, *Trans. N. Y. Acad. Sci.*, Ser. II, 2: 103, 1940.

⁸ J. Wolfram, R. L. Zwemer, *Jour. Exp. Med.*, 61: 9, 1935.

TABLE 1

ALL MICE RECEIVED A LETHAL CONVULSIVE DOSE OF INSULIN (2 OR 2.5 UNITS PER KG)

Number of mice	Protection	Per cent. convulsed	Per cent. died
(A) Controls 34	None	97	91
(B) Adrenal Cortex Extract (Upjohn) 14	2.5 dog units per gram split in 3 doses given 6, 3 and 1 hours before insulin	28.5	21.5
(C) Glucosides in water 5	0.0015 mg Oubain (U. S. Ref.) per gram*	20	0
8	0.0025 mg strophanthin per gram body weight*	12.5	0
5	0.075 mg digitalin per gram*	0	0
(D) Strophanthin in oil 5	0.0025 mg per gram body weight†	60	40
5	0.0020 mg per gram body weight†	40	40
15	0.0015 mg per gram body weight†	20	6.7

* The doses were divided so as to give $\frac{1}{3}$, $\frac{1}{3}$ and $\frac{1}{3}$ at 6, 3 and 1 hours before insulin.

† The protective dose was given in olive oil 18 hours or more before insulin.

1-B). The third group of animals were treated with U. S. P. Reference Ouabain, U. S. P. Strophanthin Merck or Digitalin NNR (Pure Merck German). The protective injection was given in split doses, beginning 6 hours before insulin. Each of these offered protection against insulin similar to that given by adrenal cortex (Table 1-C). Protection which persisted for 18 or more hours was obtained by injection of strophanthin in oil (Table 1-D). In calculating the protective effects, the incidence of death and that of convulsions is given.

Equally good results were obtained with aqueous and oily solutions of strophanthin against other amounts of insulin. Details of the various experiments on more than 150 mice will be given in the completed paper. Similar experiments on 40 rats gave a total of 62.5 per cent. deaths after insulin alone, but only 14.6 per cent. deaths in animals protected with strophanthin.

Since in earlier work, we had found that blood sugar could be elevated by adrenal cortex extracts, we next followed the blood sugar in cats following injection of strophanthin. In all six animals there was a uniform elevation of the blood sugar well outside the limits of experimental error and running concomitantly with a decrease in plasma potassium and plasma proteins as previously reported. The data from the six animals is briefly summarized in Table 2.

We take this opportunity to thank the Upjohn Company for a grant in aid of our adrenal research, and to thank Miss Ruth Rawson for the determinations of blood sugar.

CONCLUSION

We present evidence that insulin convulsions and death of mice and rats may be prevented by the previ-

TABLE 2
EFFECT OF STROPHANTHIN ON SOME BLOOD CONSTITUENTS
OF CATS

Cat	Sugar mg per cent.			Potassium mg per cent.			Protein gm per cent.		
	Initial	Max. change	Time*	Initial	Min. value	Time*	Initial	Min. value	Time*
30 gamma per kilo									
A ...	111	+17	45	22.0	20.0	15	7.58	6.02	75
B ...	100	+45	15	21.0	19.9	15	7.21	6.02	90
C ...	71	+25	10	27.6	20.8	10	7.41	7.08	30
D ...	50	+37	45	20.5	18.6	15	8.50	6.85	90
50 gamma per kilo									
E ...	61	+35	45	25.1	19.9	5	7.06	6.50	105
F ...	58	+34	60	27.3	21.3	5	7.06	6.64	75

* Times given are in minutes from injection to greatest change.

ous administration of cardiac glycosides, and that the blood sugar level of normal cats can be significantly elevated by injection of these glycosides.

Both effects are similar to those obtained with adrenal cortex extract.

In view of the cortin-like effect of steroid glycosides on potassium, previously reported by us,⁹ it is important to know that the same crystalline substances will also affect carbohydrate distribution and counteract the convulsive action of insulin. The fact that in some experiments the protection was effective when given 18 hours or more before insulin is particularly noteworthy.

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A PHYSIOLOGICALLY ACTIVE PRINCIPLE FROM CANNABIS SATIVA (MARIHUANA)

WHILE it has long been known that the physiological activity of *Cannabis sativa* (marihuana or hashish) is associated with its contained resins, no physiologically active crystalline material has heretofore been isolated. We report in this note the isolation of such a substance.

The hydrocarbon nonacosane and an oily product termed *cannabinol* were first isolated by Wood, Spivey and Easterfield.¹ In 1938 Bergel, Todd and Work² reported the preparation of a crystalline p-nitro benzoate of cannabinol which could be used to separate the cannabinol from the oil by chromatographic adsorption methods. Recently an oily product which was named *cannabidiol* was isolated by Adams, Hunt and

Clark.³ None of these well-defined products has exhibited the characteristic physiological activities that are shown by the crude drug though *cannabinol* was found to be quite toxic. Reviews of the earlier work on the chemistry of *Cannabis* have been published by Walton⁴ and by Blatt.⁵

Work on the separation of physiologically active fractions from alcoholic extracts of *Cannabis sativa* has been in progress for the past year in our laboratories. The extracts of Minnesota wild hemp used for the work were generously supplied by the Narcotics Laboratory, United States Treasury Department, and we are indebted to Messrs. H. J. Anslinger and H. J. Wollner for their collaboration which made this work possible.

The alcohol extract of the crude drug was diluted with water to yield a seventy per cent. alcohol solution, and this was partitioned into petroleum ether. Salt-forming compounds were extracted and then colored substances were largely removed by adsorption on zinc carbonate. The resultant resinous material was fractionally precipitated from methanol with water and there was obtained a physiologically active fraction of about one twentieth the weight of the crude resin material. This purified product was fractionally distilled under 0.005 mm pressure, with the most active fraction distilling at 128°–135° C. This fraction is a red-colored oil which shows typical activity in dogs following an oral dose of 1.0 mg per kg. By cooling a solution of this oil in a methanol-acetic acid mixture, some crystalline material was obtained. This was then recrystallized several times from methanol to yield colorless needles melting at 128°–129° C.

When crystalline material thus isolated was administered orally to a dog in a dose of 0.1 mg per kg, incoordination of movements followed after two hours and persisted for about four hours. A dose of 0.38 mg per kg was administered to the same dog three days later. Within two hours incoordination of movements was apparent and this effect persisted notably for six hours. A transitory catatonic depression was also observed, during which the animal gazed fixedly at particular objects for long periods of time; breathing was deep and dyspneic, and cardiac arrhythmia was noted. Fibrillary tremors of the left leg were observed as were, also, periods in which the dog engaged in vigorous though seemingly useless scratching. The dog used for these studies had been standardized for response to the crude drug material from which the crystalline material was prepared and had shown similar effects to those above noted following a dosage of 20 mg per

⁹ R. L. Zwemer and B. E. Lowenstein, *SCIENCE*, 91: 75, 1940.

¹ Wood, Spivey and Easterfield, *Jour. Chem. Soc.*, 69: 539, 1896; 75: 20–36, 1899.

² Bergel, Todd and Work, *Chem. and Ind.*, 57: 86, 1938.

³ Adams, Hunt and Clark, *Jour. Am. Chem. Soc.*, 62: 196, 1940.

⁴ R. B. Walton, "Marihuana." Pp. 223. J. B. Lippincott and Company, 1938.

⁵ A. H. Blatt, *Jour. Wash. Acad. Sci.*, 28: 465, 1938.

but a dosage of 10 mg per kg was ineffective. The crystalline material thus appears to be more than one hundred times as active as crude drug material.

For convenience we have named the compound *cannin* and the suffix *-in* may be changed later so as to conform to standard chemical nomenclature when more is known of the chemical structure.

The alkaline Beam test, used in the forensic detection of *Cannabis sativa* resin materials, was tried on *cannin* and found to be completely negative. The distillation fractions and the mother liquors from which the *cannin* was obtained gave positive tests.

Work is continuing on *Cannabis* to isolate larger quantities of this active principle for structure determination and more extensive physiological studies. A search is being made for other active principles which may be present.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

ON THE USE OF CHICK EMBRYO CULTURES OF INFLUENZA VIRUS IN COMPLEMENT FIXATION TESTS¹

Most of the complement fixation studies in influenza have been carried out with antigens prepared from infected mouse lung tissue, either fresh or desiccated.²⁻¹¹ Indeed chick embryo cultures (Smith,¹¹ Tulloch⁸) and infected chorio-allantoic membrane inoculated by the Goodpasture¹² method have also been used (Hoyle and Fairbrother,¹³ Lush and Burnet¹⁴) but with variable results.

When Cox¹⁵ reported that the direct inoculation of *Avian* of the Rocky Mountain spotted fever and *Phosphorus* groups into the yolk of the developing chick embryo resulted in the multiplication of these organisms in the yolk sac to a high concentration, it seemed that this method might lend itself to the cultivation of the influenza virus as a more satisfactory source of complement fixation antigen as well as virus. Using the

method of Cox, the PR8 strain of influenza virus killed the embryos within one or two days after which autolysis proceeded rapidly. It seemed possible that the virus might also multiply in the yolk sac with a delay in lethal effect, if it were introduced at a point outside the yolk. The virus was, therefore, inoculated between the yolk sac and the chorio-allantoic membrane, passing the needle through a small hole in the shell at the air sac end of the egg. By this method a high concentration of virus occurred in the membrane surrounding the yolk. There was sufficient virus in 0.1 cc of 10^{-4} and 10^{-5} dilutions of yolk sac tissues to produce fatal infection in both embryos and mice. When the chorio-allantoic and amniotic membranes of eggs, inoculated in the same way, were pooled and titrated, the virus titer of these combined tissues was found to be about $10\times$ higher than that of the yolk sac and $100\times$ higher than that of chorio-allantoic membrane inoculated by the Goodpasture method. The details of this particular phase of the study on the cultivation of influenza virus will appear in another publication.

The yolk sac and the pooled chorio-allantoic and amniotic membranes of embryos inoculated as described above were found, moreover, by comparative titration of these tissues and mouse lung suspensions to be good sources of complement fixing antigen for serological purposes. Antigens prepared from these tissues were comparable to antigen in mouse lung in both complement-fixing activity and specificity, as will be seen from the results in Table I. Eggs inoculated with the PR8 strain as described were incubated at 37° for 2 or 3 days. The membranes were then separated, washed in saline and drained on filter paper. The tissues were ground to a paste with alundum and saline added to make 10 per cent. suspensions. For comparison 10 per cent. suspensions were similarly prepared from the lungs of mice inoculated three days previously with the same strain of virus. The antigens were clarified as much as possible in the centrifuge and serial dilutions were titrated against serial dilu-

¹ These investigations were financed largely by a grant from the International Health Division of the Rockefeller Foundation.

² R. W. Fairbrother and L. Hoyle, *Jour. Path. and Bact.*, 44: 213, 1937.

³ L. Hoyle and R. W. Fairbrother, *Brit. Med. Jour.*, 1: 5, 1937.

⁴ *Ibid.*, *Jour. Hyg.*, 37: 512, 1937.

⁵ Thomas Francis, Jr., T. P. Magill, E. R. Rickard and Dorothy Beck, *Am. Jour. Pub. Health*, 27: 1141, 1937.

⁶ R. W. Fairbrother and A. E. Martin, *Lancet*, 1: 718, 1938.

⁷ Allison P. Morrison, Dorothy R. Shaw, Athol S. Kenyon and Joseph Stokes, Jr., *Am. Jour. Med. Sci.*, 197: 3, 1939.

⁸ W. J. Tulloch, *Edinburgh Med. Jour.*, 46: 117, 200, 340 and 415, 1939.

⁹ A. E. Martin, *Jour. Hygiene*, 40: 104, 1940.

¹⁰ M. D. Eaton and E. R. Rickard, in press.

¹¹ Wilson Smith, *Lancet*, 2: 1256, 1936.

¹² Ernest W. Goodpasture, *Am. Jour. Hygiene*, 28: 111, 1938.

¹³ L. Hoyle and R. W. Fairbrother, *Brit. Jour. Exp. Path.*, 18: 425, 1937.

¹⁴ Dora Lush and F. M. Burnet, *Australian Jour. Exp. Biol. and Med. Sci.*, 15: 375, 1937.

¹⁵ Herald R. Cox, *Pub. Health Rep.*, 53: 2241, 1938.

TABLE I
COMPARISON OF EGG MEMBRANES AND MOUSE LUNG AS ANTIGENS IN COMPLEMENT FIXATION TESTS

Antigen					Convalescent serum diluted					Normal serum diluted		
Normal tissue	Infected tissue		10 per cent. susp. diluted		1-4	1-8	1-16	1-32	1-64		1-4	1-8
Yolk sac C.A.-A. Mouse lung	Yolk sac No. 1		1-16	S.R.	++++	++++	++++	++++	+++	S.R.	0	0
	C.A.-A. No. 1		1-16	"	++++	++++	++++	++++	++	"	0	0
	C.A.-A. No. 2		1-8	"	++++	++++	++++	++++	++	"	0	0
	Mouse lung No. 1		1-8	"	++++	++++	++++	++++	+++	"	0	0
			1-8	"	0					"	0	0
Yolk sac C.A.-A. Mouse lung			1-8	"	0					"	0	0
	Yolk sac No. 1		1-16	J.E.	++++	++++	++++	+++	+	J.E.	0	0
	No. 2		1-8	"	++++	++++	++++	+++	+	"	0	0
	C.A.-A. No. 1		1-16	"	++++	++++	++++	+++	0	"	0	0
	No. 2		1-8	"	++++	++++	++++	+++	0	"	0	0
Yolk sac C.A.-A. Mouse lung	Mouse lung No. 2		1-8	"	++++	++++	++++	+++	+	"	0	0
			1-8	"	0					"	0	0
			1-8	"	0					"	0	0
			1-8	"	0					"	0	0
			1-8	"	0					"	0	0
Yolk sac C.A.-A. Mouse lung	Yolk sac No. 1		1-16	Pos.* Con.	++++	++++	++++	++++	+++	Neg. Con.	0	0
	No. 2		1-8	"	++++	++++	++++	++++	++	"	0	0
	C.A.-A. No. 1		1-16	"	++++	++++	++++	++++	++	"	0	0
	No. 2		1-8	"	++++	++++	++++	++++	++	"	0	0
	Mouse lung No. 1		1-8	"	++++	++++	++++	++++	+++	"	0	0
Yolk sac C.A.-A. Mouse lung	" No. 2		1-8	"	++++	++++	++++	++++	+++	"	0	0
			1-8	"	0					"	0	0
			1-8	"	0					"	0	0
			1-8	"	0					"	0	0
			1-8	"	0					"	0	0

* Pos. Con. consisted of 6 pooled convalescent sera.

Neg. Con.—Normal serum.

C.A.-A.—Pooled chorio-allantoic and amniotic membranes.

Test: 0.2 cc serum dilutions.

0.2 cc complement diluted 1-20 (2 units).

0.2 cc antigen (one optimal dose).

After 1 hour incubation in the 37° water bath, 0.5 cc sensitized cells was added and the tests incubated for 30 minutes.

++++—Complete fixation. 0—No fixation.

None of the sera was anti-complementary in 1-4 dilution.

None of the antigens was anti-complementary in 1-8 dilution.

tions of human convalescent serum to determine the optimal antigenic activity of each suspension. Complement fixation tests were carried out with the optimal antigenic dose of each suspension and human sera, convalescent and normal. The egg membrane and mouse lung antigens were entirely comparable in activity. Two suspensions similarly prepared from the embryos themselves were devoid of complement-fixing activity.

The chorio-allantoic and amniotic membranes have the following special advantages as complement-fixing antigen: (a) A relatively clear solution is obtained by centrifuging the saline suspensions of the membranes. (b) The membranes from one egg yield approximately 100 cc of antigen, diluted ready for use, or as much antigen of the same or better activity as the lungs from 6 or 7 mice yield. (c) These egg antigens can be used with ferret serum, whereas mouse lung can not because of the heterophile reactions between ferret serum and normal mouse lung.²

A further elaboration of the studies in this preliminary report will appear in a subsequent publication.

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